

UNCLASSIFIED

AD 255817

*Reproduced
by the*

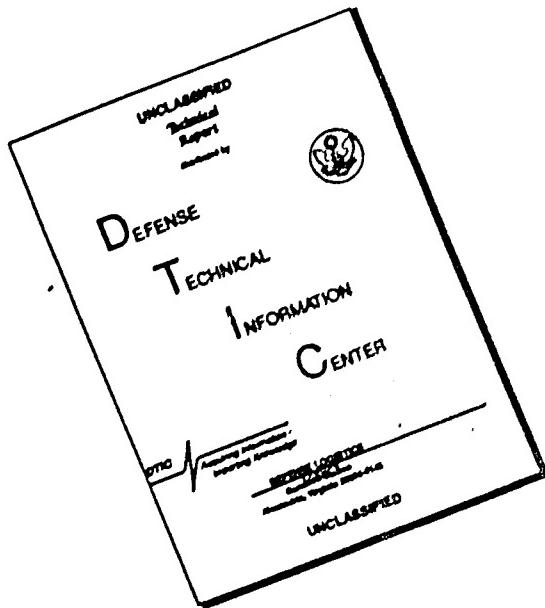
**ARMED SERVICES TECHNICAL INFORMATION AGENCY
ARLINGTON HALL STATION
ARLINGTON 12, VIRGINIA**



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

DISCLAIMER NOTICE



**THIS DOCUMENT IS BEST
QUALITY AVAILABLE. THE COPY
FURNISHED TO DTIC CONTAINED
A SIGNIFICANT NUMBER OF
PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**

CATALOGUED BY ASTIA 255817
AS AD N^o 11

DEPARTMENT COPY
Development and Proof Services

AUTOMOTIVE DIVISION

REPORT ON

TRAILER, CARGO: 1/4-ton, 2-wheel, XM416E1

REPORT NO. DPS-224

(OMS CODE NO. 5510.12.227)

(D. A. PROJECT NO. 546-07-017)

SUBMITTED:

P. Laichinger, Jr.

P. LAICHINGER

APPROVED:

H. A. Noble

H. A. NOBLE
FOR THE DIRECTOR

MAY 1961

XEROX



8 360

DEPARTMENT COPY

330°
*Aberdeen Proving Ground
Maryland*

DEVELOPMENT AND PROOF SERVICES
ABERDEEN PROVING GROUND
MARYLAND

AUTHORITY: ORDTW-TVS

Plaichinger/tsp

TEST OF TRAILER, CARGO: 1/4-ton, 2-wheel,
XM416EL

Report No. DPS-224

Dates of Test: 12 January to 31 March 1961

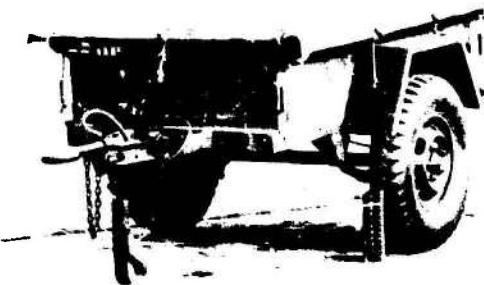
ABSTRACT

The XM416EL trailer was tested to determine its compatibility with the M151 truck and its durability. The trailer was towed 6479 miles on various test courses by an M151 truck. Observations were made of the performance of the trailer, and of the ability of the M151 truck to tow the trailer. The trailer was proved to be compatible with the M151 truck. Deficiencies in general were minor in nature. Most difficulty was experienced with wear of suspension components. It is recommended that upon correction of the deficiencies listed, the trailer be considered acceptable for military use.

CONTENTS

PAGE NO.

INTRODUCTION	5
DESCRIPTION OF MATERIAL	5
DETAILS OF TEST	6
Engineering Tests	6
Durability Tests	7
CONCLUSIONS	10
RECOMMENDATIONS	10
REFERENCE	12
APPENDIX A: DIRECTIVE LETTER	A-1
APPENDIX B: DEFICIENCY RECORDS	B-1
APPENDIX C: PHOTOGRAPHS	C-1
APPENDIX D: LABORATORY REPORT	D-1
APPENDIX E: DISTRIBUTION	E-1



TRAILER, CARGO: 1/4-ton, 2-wheel, XM416El

COMPONENTS:

Brakes:.... Hand operated parking
Suspension: Leaf spring
Tires: 7.00x16, 6 ply rating

Ground Clearance.... 10 in.
Tread:..... 52-3/4 in.

DIMENSIONS:

Overall:

Length: 111-3/4 in.
Width 60-3/4 in.
Height 43-1/4 in.

PRIME MOVER:
TRUCK, UTILITY: $\frac{1}{4}$ ton, 4x4,
M151

Cargo Body (Inside):

Length 98 in.
Width 41 in.
Height 11 in.

WEIGHTS:
Empty: 625 lb.
With 500 pound
cross-country
load:..... 1125 lb.
With 750 pound
highway load:.... 1375 lb.

Figure 1 - S18-001-159-2330-64-5P/ORD-61: Characteristics of
XM416El Trailer.

1. INTRODUCTION

After the standardization of TRUCK, UTILITY: 1/4-ton, 4x4, M151, there arose a requirement for a compatible 1/4-ton trailer. The TRAILER, CARGO: 1/4-ton, 2-wheel, M100, which was developed to be towed by the M38 truck, was not compatible with the M151 truck in that differences existed in wheel tread, wheel design, pintle and lunette height, and in provision for safety chains and intervehicular cable. One M100 trailer was modified by increasing the wheel tread to 53-1/4 inches, providing for two lunette-height positions, and increasing wheel clearance under the fenders. This trailer was designated M100C and was tested for compatibility with the M151 truck by the United States Army Armor Board (Reference 1). The M100C trailer was found to be lacking in compatibility because of interference of the storage box on the trailer with the intervehicular cable receptacle, and the lack of interchangeability of the wheels.

The XM416E1 trailer was developed from the M100C to eliminate the deficiencies of the M100C, and to be fully compatible with the M151 truck.

2. DESCRIPTION OF MATERIAL

The XM416E1 trailer (Figure 1) was developed from the M100 and is quite similar to it. The more pertinent differences of the XM416E1 are as follows:

- a. The wheel tread is 52-3/4 inches instead of 48 inches.
- b. The wheels are the same as those used on the M151 truck.
- c. The fenders have been raised and are trapezoidal in design instead of round.
- d. A two-position lunette bracket is used.
- e. There is no storage box on the front of the trailer body.
- f. The safety chains are longer and have safety hooks instead of grab hooks.
- g. The intervehicular cable is longer.
- h. There is provision in the wiring harness for direction-signal lamps.
- i. The body is made of 950 steel instead of low-carbon steel.

3. DETAILS OF TEST

3.1 Procedure and Results

3.1.1 Initial Inspection. Initial inspection disclosed no deficiencies. The spring-clip nuts and body bolts required tightening. Shortly after initial inspection it was noted that the paint was peeling off (Deficiency No. 1, page B-1).

3.2 Miscellaneous Engineering Tests. General-view photographs were taken and a characteristics photograph was prepared (Figure 1 and Appendix C).

The weight distribution (lb) was found to be as follows:

	<u>Empty</u>	<u>With 475-lb Payload</u>
Left wheel	260	495
Right wheel	255	505
Landing leg	110	100
Total weight	625	1100

With 475-pound payload, lunette reaction at 18-1/2 inches was 110 pounds.

The physical dimensions are shown in the sketch on page D-3.

The center of gravity of the empty trailer was found to be 23 inches above ground level and 41-1/2 inches forward of the rear edge of the cargo body.

The trailer with 500-pound payload was towed up and down various slopes up to and including the 40% slope. The M151 truck was able to handle the trailer on these slopes without difficulty. Stopping the train while descending a 40% slope is tricky. Since the trailer does not have service brakes, all forward force of the trailer must be impeded by the truck, and therefore the train is easily jackknifed.

The trailer was stable on the 30% side slope.

The trailer was towed up and down the 20° ramp with sharp approach and crest. No interference was encountered.

The trailer with 500-pound load was floated in water for 20 minutes. Approximately one pint of water leaked through the drain valve. This test was conducted after cross-country operation and the seat of the drain valve was dirty.

The trailer was towed in short-radius circles and was jackknifed to check the length of the safety chains and intervehicular cable. There was sufficient slack in the chains and cable. The cable appeared to be particularly well situated (being mounted on the right drawbar rail just to the rear of the lunette, and pointed slightly upward) to reduce the possibility of pinching between the drawbar and tumperettes when the train was jackknifed. At times when passing over humps and bumps the safety chains droop sufficiently to drag the ground. However, this must be tolerated, since the full length of chain is necessary to prevent binding when jackknifing.

Throughout the test the drivers and the project engineer observed that the trailer tracked well and there was no complaint of its lack of ability to follow the M151 truck. No 'dog tracking' was experienced during the test.

With cross-country payload, the parking brakes held, both uphill and downhill, on a 15% slope.

With cross-country payload, resistance to towing was found to average 20 pounds between 20 and 30 mph. This determination was made on a smooth, level, paved road.

3.1.3 Durability Test. The trailer was towed a total of 6479 miles in the durability test. M151 trucks were used as prime movers for all of this mileage. Mileage breakdown is as follows:

Course	Mileage		
	Empty	500-lb Load	750-lb Load
Paved road	51	318	2000
Gravel road	-	1433	
Belgian block	50	627	
Perryman cross-country	-	1400	
Churchville cross-country	-	600	
Total	101	4378	2000

During the period this vehicle was tested, the weather included much rain and snow. The cross-country courses were muddy most of the time, except during the early part of the test when they were frozen. The trailer withstood operation on the frozen course satisfactorily. When the level cross-country course was muddy, care was taken to drive on hardpan to avoid becoming mired. No difficulty was experienced with the tracking of the trailer. When operating on the hilly cross-country course in mud, the M151 truck and the trailer slipped in and out of existing ruts which had been made by wider vehicles. Driver care was required when descending slippery, muddy slopes to prevent the train from jackknifing, since the trailer does not have service brakes.

As previously noted, the paint started peeling off the trailer before the durability test was started. As the test progressed more paint came off until at the end of the test about 80% of the paint and undercoating was off. Since the primer came off with the paint, it is believed that the difficulty was caused by improper preparation of the steel surfaces. After 2000 test miles, the undercoat on the bottom of the trailer came off in sheets (see Deficiency Record No. 1, page B-1). After the test all paint was removed, and the trailer was repainted.

Most difficulty during the test concerned the suspension system. The suspension system is essentially the same as used on the M100 and World War II 1/4-ton trailers. These same problems were experienced when towing these trailers on muddy terrain. The presence of mud in the spring pivot bolt bushings caused rapid wear of the bushings and pivot bolts, as shown in Figures 2 and 3 (see also Deficiency Record No. 3, page B-3). The spring clips became loose and permitted the leaves to fan. Several times the spring packs were straightened, the spring clip nuts tightened, and the spring rebound clips tightened. (Deficiency Record No. 4, page B-4). The springs also had a tendency to work on the shackles (called U bolts). By 3885 test miles the lower left shackle bearing wore into the spring eye. The left spring assembly and left spring shackle were replaced. At the end of the test, it was noted that the front end of the second leaf of the left spring was broken off. This was caused by the pinching of the spring leaf by the spring hanger. The last incident cannot be considered a deficiency since it involved a replacement spring.



Figure 2: Wear of Left Spring Pivot Bolt and Bushing in 3617 Test Miles.



Figure 3: Wear of Right Spring Pivot Bolt and Bushing in 3617 Test Miles.

At 1830 test miles the right wheel bearing became loose. Dirt was found in the bearing; it had entered through a cut seal. The seal was replaced and the bearings were packed with fresh grease. This was not considered a deficiency since wheel bearing seals are frequently cut by dragging across the spindle threads. While the hubs were off the trailer at 1830 test miles, all wheel studs were replaced by corrected studs as requested by the manufacturer. At the final inspection water was found in the hubs. This water had entered around the hub caps when the trailer was floated (see Deficiency Record No. 6, page B-6).

At 1484 test miles it was noted that the center body floor stiffener tore loose at each end. This was merely the breaking of tack welds which were inadequate (see Deficiency Record No. 2, page B-2, and Figure 4).



Figure 4: Left End of Body Floor-Stiffener Torn Loose from Floor.
Appearance of Right End Was Similar.

After 5687 test miles the support leg pin became frozen due to rust. Part of the operation was on snow-covered courses and the salts used to melt snow accelerated the rusting of the pin (see Deficiency Record No. 5, page B-5). At the same time it was noted that the safety catch on the left safety chain was lost (see Deficiency Record No. 7, page B-7).

At the final inspection it was noted that the brake lining was worn beyond the rivet heads. Although the brakes are only parking brakes, sufficient mud entered them to abrade their lining (see Deficiency Record No. 8, page B-8).

3.1.4 Final Inspection. After the durability test : final inspection was performed. Items relating to the deficiencies encountered in the durability phase were discussed in the preceding paragraphs. The following additional items were noted in the final inspection:

- a. All lamps functioned satisfactorily.
- b. The cover on the intervehicular cable was torn loose. This could have been caused by careless handling, and is not a problem peculiar to the XM416El.
- c. There was snubbing action in the shock absorbers.

After the final inspection, all necessary repairs were made. The remaining original paint was removed and the trailer was properly repainted.

4. CONCLUSIONS

With exception of the deficiencies noted, the durability of the trailer was generally satisfactory.

Performance of the trailer, when towed by an M151 truck, was satisfactory and the trailer is fully compatible with this truck.

Wear of the suspension components and brake linings was accelerated by operation in mud.

Failure of the paint was the result of improper preparation of the steel surfaces.

5. RECOMMENDATIONS

Upon correction of the deficiencies listed, the XM416El trailer should be considered acceptable for military use.

A study should be made to develop suspension hardware, such as spring shackles, pivot pins, and related items, with greater resistance to wear during operation in muddy conditions.

SUBMITTED:

Paul Laichinger, Jr.
PAUL LAICHINGER, JR.
Chief, Trailer and Transporter Section

REVIEWED:

C. F. Waters
C. F. WATERS
Chief, Transport
Vehicles Branch

C. D. Montgomery
for W. A. GROSS, JR.
Chief, Automotive Division

APPROVED:

H. A. Noble
H. A. NOBLE
Assistant Deputy Director
for Engineering Testing
Development and Proof Services

REFERENCE

United States Army Armor Board Report No. 2063, "Evaluation of Trailer, Cargo, 1/4-ton, 2-wheel, M100C," dated 6 April 1960.

APPENDICES

	<u>PAGE NO.</u>
A, DIRECTIVE LETTER	A-1
B, DEFICIENCY RECORDS	B-1
C, PHOTOGRAPHS	C-1
D, LABORATORY REPORT	D-1
E, DISTRIBUTION	E-1

APPENDIX A

Directive Letter



IN REPLY REFER TO

HEADQUARTERS
DEPARTMENT OF THE ARMY
 OFFICE OF THE CHIEF OF ORDNANCE Lt Col Hoffman/eop/75118
 WASHINGTON 25, D.C.

JAN 12 1961

CRDTW-TVS 244

SUBJECT: Test Directive for Engineering Test of Trailer, Cargo,
 1/4 ton, 2 wheel, XM416El

TO: Commanding General
 Aberdeen Proving Ground
 Attn: CRDRC-DPS-TU
 Maryland

1. Four TRAILERS, CARGO: cargo, 1/4 ton, 2 wheel, XM416El, were developed under Department of the Army project number 546-07-017 (QMS 5510.12.227). In conformance with agreement made in May 1960 by representatives of CRD, USOMAR, CCO and CTAC the four subject trailers have been delivered to test locations. One each vehicle is at Aberdeen Proving Ground for engineering test, the USA Armor Board and the USA Arctic Test Board for user tests and Detroit Arsenal for maintenance evaluation. Decision to conduct concurrent engineering and user tests was made due to the urgent requirement for a companion trailer for the TRUCK, UTILITY: 1/4 ton, 4x4, M151 now in production. Tests are scheduled for completion by 1 Mar 1961 and final reports are desired by 1 April 1961 in order to allow type classification in fourth quarter of FY 61.

2. Test Requirements:

a. General: Subject trailer has been developed for use with the TRUCK, UTILITY: 1/4 ton, 4x4, M151, and testing of the trailer is intended to determine its compatibility with and suitability for use with the M151. Further, this testing should determine adequacy of design and construction of the XM416El trailer.

b. Prime Mover: Truck, Utility, 1/4-ton, 4x4, M151

c. Payloads: When loaded for test purposes, the trailer shall have a uniformly distributed payload with center of gravity compatible with center of gravity of average density cargo, of 500 pounds for cross-country operations, and 750 pounds for highway operation.

DRAFT - 100

SUBJECT: Test Directive for Engineering Test of Trailer, Cargo,
1/4 ton, 2 wheel, XM416E1

d. Test Procedures: In conformance with OPM 60-145 dated 11 May 1960, Group A, Special observation is requested for the following:

- (1) Ability of wheel studs and nuts to maintain proper torque.
- (2) Adequacy of length and suitability of safety chains.
- (3) Tracking ability with M151 truck, and general adequacy and performance with this prime mover.
- (4) Suitability and functioning of intervehicular jumper cable.

e. Reports Desired:

- (1) OPM 60-20, Deficiency Reports
- (2) OPM 60-390, Formal Report
- (3) OPM 60-391, Memorandum Reports: Preferably at two-week intervals.

f. Full photographic coverage (Sec. 9, OPM 60-395), including appropriate motion pictures effectively illustrating vehicle operation, suspension action, and other pertinent features. Prints and copies of motion picture film should be furnished OTAC at earliest practicable date.

3. Requirement for formal test plan (Sec 3, OPM 60-395) is waived due to urgency of completing test within time scheduled, comparative simplicity of the item being tested and the definitive description of desired test procedures by the OPM references listed herein. The proposed test procedure is not intended to limit or restrict your installation in conduct of the test. Recommended changes and deviations desired may be made to this office for approval and incorporated in the test when approved.

4. Detailed descriptive data and parts information will be forwarded directly to your installation by OTAC under separate cover.

JAN 1 2 1961

SUBJECT: Test Directive for Engineering Test of Trailer, Cargo,
1/4 ton, 2 wheel, XM16E1

5. This is your authority to initiate test using fund resources
available to your installation under QMS Code 5510.12.227A.

FOR THE CHIEF OF ORDNANCE:

G. D. CARNAHAN
Lt Col, Ord Corps
Chief, Arty & Veh Sys Br
Research and Development Division

Cy furnished:
CRD
CG, OTAC, Det Ars
Attn: ORDMC-R&W
CG, USCCNARC
Attn: ATDEV-2

APPENDIX B
Deficiency Records
DEFICIENCY RECORD

DATE: 22 Mar 61

DEFICIENCY NO.: 1 ENGINEER: P.Laichinger

ITEM UNDER TEST: TRAILER, CARGO: $\frac{1}{2}$ ton, 2 wheel, XM416E1

VEHICLE TYPE: Cart Type Trailer REG. NO.: 6D8964

DATE OF INCIDENT: 17 Jan - 23 Feb 61 ODOMETER: PART MILEAGE: 0-2000

MAJOR: MINOR: DESIGN: MANUFACTURING:

SNL GRP: _____ NOMENCLATURE: _____ PART NO. _____

32 Paint and Undercoat

Synopsis: Before the vehicle was operated, it was noted that the paint was flaking off. There was primer on the back of the paint chips. It is possible to slip a knife blade under the paint and pull off pieces. After approximately 2000 miles, the undercoat is coming off in large pieces.

Cause: The primer does not adhere to the steel. Apparently the steel surfaces were not adequately cleaned before priming.

Action: None. The trailer will be painted at completion of the test.

DEFICIENCY RECORD

DATE: 22 Mar 61

DEFICIENCY NO.: 2 ENGINEER: P. Laichinger

ITEM UNDER TEST: TRAILER, CARGO: 1-Ton, 2 Wheel, XM416E1

VEHICLE TYPE: Cart type trailer REG. NO.: 6D8964

DATE OF INCIDENT: 21 February 1961 ODOMETER: PART MILEAGE: 1484

MAJOR: MINOR: DESIGN: MANUFACTURING:

ENCL GRP: _____ NOMENCLATURE: _____ PART NO. _____

18 Body floor stiffener

Synopsis: The center body stiffener is tearing loose at each end.

Cause: Not known at this time.

Action: No repair has been made. Progression of this failure will be observed throughout the test.

DEFICIENCY RECORD

DATE: 22 Mar 61

DEFICIENCY NO.: 3 ENGINEER: P. Laichinger

ITEM UNDER TEST: TRAILER, CARGO: $\frac{1}{4}$ Ton, 2 Wheel, XM416E1

VEHICLE TYPE: Cart type trailer REG. NO.: 6D8964

DATE OF INCIDENT: 27 Feb - 8 Mar 61 ODOMETER: 2065 PART MILEAGE: 3617

MAJOR: MINOR: DESIGN: MANUFACTURING:

SNL GRP NOMENCLATURE PART NO.

16 Bolt, pivot 7328328
16 Bearing, bushing type, pivot bolt 7328366

Synopsis: At odometer 2065, it appeared that the spring pivot bolts were worn. At odometer 3617, the pivot bolts were removed and found to be severely worn. The pivot bolt bushings were also worn.

Cause: During this period, 1363 miles were off road operation. The courses were muddy. Although pivot pins were lubricated frequently mud entered the bearings and accelerated wear.

Action: The pivot bolts and bearings were replaced.

DEFICIENCY RECORD

DATE: 22 Mar 61

DEFICIENCY NO: 4 ENGINEER: P.Laichinger

ITEM UNDER TEST: TRAILER, CARGO: $\frac{1}{2}$ Ton, 2 Wheel, XM416E1

VEHICLE TYPE: Cart Type Trailer REG. NO.: 6D8964

DATE OF INCIDENT: 27 Feb - 10 Mar 61 ODOMETER: 2065 -
PART MILEAGE: 3885

MAJOR: MINOR: DESIGN: MANUFACTURING:

SNL GRP: _____ NOMENCLATURE: _____ PART NO.:

16 Bolt, "U" LH thd. 7371090
16 Spring, assembly

Synopsis: On several occasions the left spring leaves became fanned. The spring clips were loosened, the spring pack straightened, and the spring clips tightened. The springs also had a tendency to work on the shackles which are called "U" bolts. The lower left shackle bearing wore into the spring eye.

Cause: This is a common deficiency in vehicles (M100, M38, and M38A1) which use the open "U" bolt type shackle. looseness in the shackle permits the spring to cock.

Action: The left spring assembly and the left spring shackle assembly were replaced.

DEFICIENCY RECORD

DATE: 4 Apr 61

DEFICIENCY NO. 5 ENGINEER: P.Laichinger

ITEM UNDER TEST: TRAILER, CARGO: $\frac{1}{4}$ Ton, 2 Wheel, XM416E1

VEHICLE TYPE: Cart type trailer REG. NO.: 6D8964

DATE OF INCIDENT: 20 Mar 1961 ODOMETER: _____ PART MILEAGE: 5687

MAJOR: MINOR: DESIGN: MANUFACTURING:

S/N GRP NOMENCLATURE PART NO.

15 Pin, support leg

Synopsis: The support leg pin became frozen due to rust.

Cause: Much of the operation has been on muddy and snow covered courses. Salt and calcium chloride used to melt ice on roads accelerated rusting.

Action: The pin was freed and cleaned during final inspection.

DEFICIENCY RECORD

DATE: 4 Apr 61

DEFICIENCY NO.: 6 ENGINEER: P.Laichinger

ITEM UNDER TEST: TRAILER, CARGO: 1 Ton, 2 Wheel, XM416E1

VEHICLE TYPE: Cart type trailer REG. NO.: 6D8964

DATE OF INCIDENT: 28 Mar 61 ODOMETER: 6474 PART MILPAGE:

MAJOR: MINOR: DESIGN: MANUFACTURING:

ENCL OR PT: _____ NOMENCLATURE: _____ PART NO. _____

13 Caps, hub

Synopsis: During final inspection, water was found in the hubs. The trailer had previously been floated.

Cause: The water had leaked in past the hubs. There is no gasket, "O" ring, or seal under the hub caps.

Action: The wheel bearings were cleaned and repacked.

DEFICIENCY RECORD

DATE 4 Apr 61

DEFICIENCY NO 7 ENGINEER P. Laichinger

ITEM UNDER TEST TRAILER, CARGO: 1/2 Ton, 2 Wheel, XM416E1

VEHICLE TYPE Cart type trailer REG. NO 6D8964

DATE OF INCIDENT 20 Mar 61 ODOMETER PART MILEAGE 5687

MAJOR MINOR DESIGN MANUFACTURING

ENCL GRP NOMENCLATURE PART NO.

15 Hook, Safety Chain

Synopsis: The safety catch on the left safety chain hook was lost.

Cause: Unknown.

Action: None.

DEFICIENCY RECORD

DATE: 4 Apr 61

DEFICIENCY NO.: 8 ENGINEER: P.Laichinger

ITEM UNDER TEST: TRAILER, CARGO: $\frac{1}{2}$ Ton, 2 Wheel, XM416E1

VEHICLE TYPE: Cart type trailer REG. NO.: 6D8964

DATE OF INCIDENT: 28 Mar 61 ODOMETER: _____ PART MILEAGE: 6474

MAJOR: MINOR: D-SIGN: MANUFACTURING:

INL GRP: _____ NOMENCLATURE: _____ PART NO.:

12 Lining, Brake

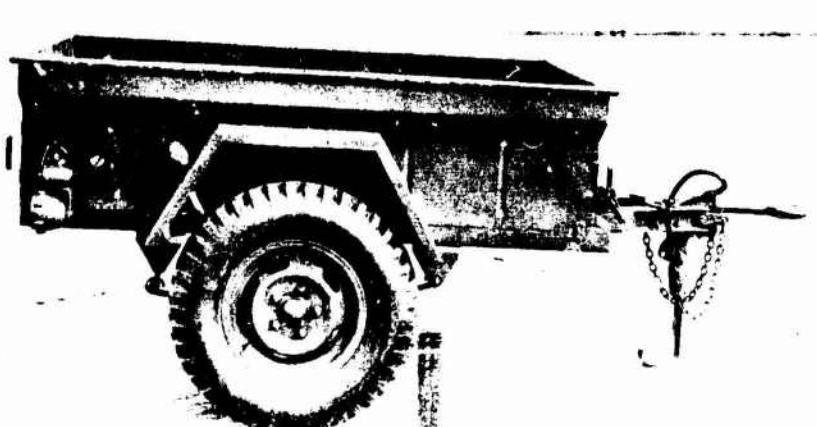
Synopsis: The brake lining was worn past the rivet heads.

Cause: Most of the off-road operation was in mud. Although the brakes are only parking brakes, sufficient mud entered them to abrade the lining.

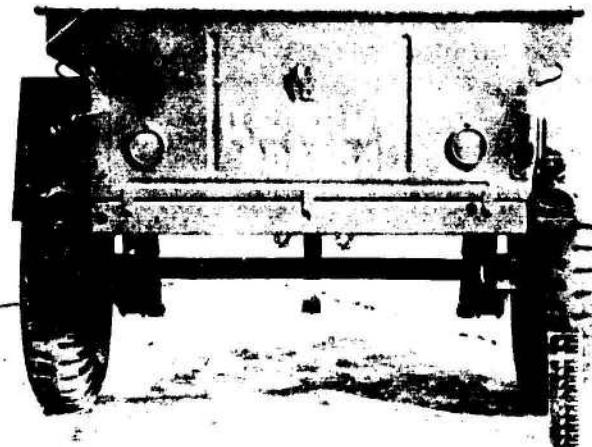
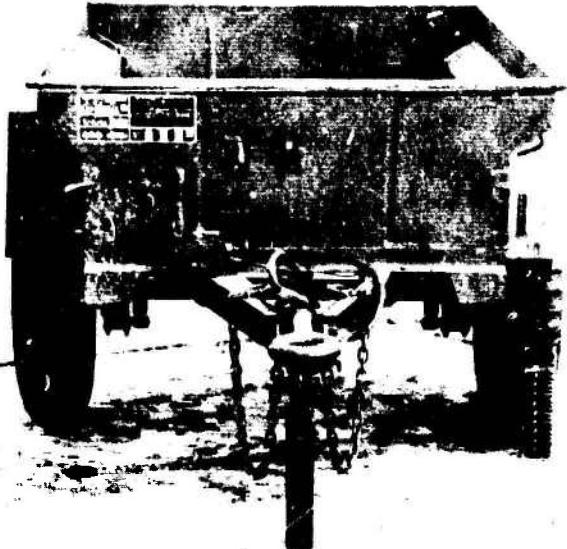
Action: The brakes were relined at final inspection.



S18-001-155-2330-64-1P/ORD-61: Trailer, Cargo, 1/4-Ton, 2-Wheel,
XM416EL. Left Front View.



S18-001-156-2330-64-2P/ORD-61: Trailer, Cargo, 1/4-Ton, 2-Wheel,
XM416EL. Right View.



S18-001-157-2330-64-3P/ORD-61: Trailer, Cargo, 1/4-Ton, 2-Wheel,
XM416EL. Top: Front View. Bottom: Rear View.



S18-001-158-2330-64-4P/ORD-61: Trailer, Cargo, 1/4-Ton, 2-Wheel,
XM416EL. Top View.

Automotive Laboratory Report

Laboratory Report

ANNE ARUNDEL PROVINCIAL GROUNDS, MARYLAND

AUTOMOTIVE ENGINEERING LABORATORY REPORT

PROJECT NO: 227 A0/171

DATE: 16 February 1961

REPORT NO: 61-13

PERFORMANCE AND PHYSICAL CHARACTERISTICS OF TRAILER,

CARGO: TWO WHEEL, $\frac{1}{4}$ TON, XM416E1 USA REG NO. 6D8964

TABLE OF CONTENTS

PAGE NO.

1. INTRODUCTION	2
2. RESULTS	2

INCLOSURES

1 Sketch No. 61-13-1

1. INTRODUCTION

1.1 Object

To determine basic performance and physical characteristics of trailer, Cullis, 2 Wheel, $\frac{1}{2}$ Ton, YM416EM USA Reg No. 608964.

2. RESULTS

2.1 General

The center of gravity location was:

- a. Vertically 23 inches from ground level and 7 inches from center line of wheel.
- b. Horizontally from rear edge of cargo bed $4\frac{1}{2}$ inches.

The parking brake held the trailer on the 15% longitudinal slope in both the forward and reverse direction.

Individual wheel loading with and without payload was as follows:

	<u>w/o Payload</u>	<u>w/Payload</u>
Left Wheel	260	495
Right Wheel	255	505
Landing Leg	<u>110</u>	<u>100</u>
total weight - lbs 625		1100

With a pintle height of $16\frac{1}{2}$ inches and with the required payload. The force on the trailer pintle was 110 pounds.

An average of 20 pounds drawbar pull was required to tow the loaded trailer from road speeds of 20 to 30 mph.

Physical dimensions and center of gravity location are presented on Sketch No. 61-13-1.

SUBMITTED:

T. J. Walsh

T. J. WALSH
Engineer

REVIEWED:

R. M. Willes
R. M. WILLES
Field Engineering Section

D-2

APPROVED:

R. W. Johnson
R. W. JOHNSON
Chief, Automotive Engineering Lab

TAILER, CARGO, 2 WHEEL, $\frac{1}{2}$ TON, X-416M USA REG. NO. 612564

Physical Dimensions and Center of Gravity
All Dimensions in Inches

